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EXAMINER

MOORE, KARLA A

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/632,736

Applicant(s)

MELNIK ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☒ Claim(s) 1-26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 16 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Each of the claims is worded in a way that it is unclear to the Examiner what Applicant intends to claim. Clarification and/or correction is requested.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-5, 7-8, 12-14, 17-18, 20, 13 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,993,542 to Yanashima et al in view of Great Britain Patent No. 1218544 to King.

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6. Yanashima et al. disclose a reactor capable of growing a gallium containing single crystal substantially as claimed in Figure 7 and comprising: a reactor tube (Figure 7, 111); a substrate (101) positioned in the reactor tube; a multi-zone heater (141); a growth zone (between bottom surface of partition plate 113 and bottom of chamber and from edge of partition plate 113 to far right of chamber), wherein said multi-zone heater is capable of maintaining at least one substrate within said growth zone at a temperature greater than 850°C (column 12, rows 25 and 26); a extended gallium source within a gallium source zone (between partition plates 113 and 114); a halide reaction gas source (labeled "HCl") coupled to said multi-zone gallium source zone; an inert gas source (labeled "N<sub>2</sub>") coupled to said multi-zone gallium source zone to transport a first reaction product from said multi-zone gallium source zone to said growth zone; and a reaction gas source (labeled "NH<sub>3</sub>") coupled to said growth zone. Gallium source can be considered an extended source as it extends in a plurality of directions to form a volume.

Examiner was unable to find a special definition in the Applicant's specification that set forth specific dimensions regarding what Applicant's considers "extended".

7. However, Yanashima et al. fail to teach the extended gallium source within a multi-zone gallium source zone, wherein said multi-zone heater is capable of maintaining a first portion of said extended gallium source zone at a first temperature greater than 450°C while simultaneously maintaining a second portion of said extended gallium source at a second temperature in the range of 30°C to 100°C, wherein upon reaction said second portion comprises at least 50 percent of said extended gallium source.

8. King teaches discloses a single crystal growing apparatus capable of controllably positioning a source material for the purpose of controlling the temperature of the source material as needed for an intended processing method (column 1, row 9 through column 2, row 60).

9. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided the elongated source in Yanashima et al. as a controllably positionable source in order to control the temperature of the elongated source as needed for an intended processing method as taught by King.

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10. Examiner notes that the courts have ruled that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Applicant's claims contain numerous recitations drawn to a method of using the apparatus and a results produced by using the method. These are not viewed as structural limitations as they do not recite any additional structure present in the apparatus or expand upon structures previously recited. It is noted that the courts have also ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

11. With respect to claims 2-3, the structural limitations of the claims are addressed above. Examiner again notes that Applicant's recitations involving a method for using the apparatus do not distinguish themselves from the prior art in terms of structure and the courts have ruled that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

12. With respect to claims 4, Yanashima et al. disclose the invention substantially as claimed and as described above. Additionally, Yanashima et al. disclose an aluminum source zone (above partition 116), wherein said halide reaction gas source is coupled to the aluminum source zone and means for heating (141) the aluminum source zone are provided, as well. The aluminum source is an organic metal compound supplied from a bubbler (120) using a carrier gas. Yanashima et al. further teach that Group 3 elements may be supplied to the reactor as either organic metal compounds or simple elements (column 3, rows 16-18).

13. However, Yanashima fail to explicitly teach the aluminum source with the inert gas source (described above) coupled to it.

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14. Yanashima et al. teach repeatedly in his disclosure all of the simple elements sources coupled to the same inert gas source for the purpose of using nitrogen as a carrier gas (column 11, rows 38-39 and 44-45).

15. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made, if the aluminum source had been a simple element, to have provided said inert gas source coupled to said aluminum source in Yanashima et al. in order to use the nitrogen as a carrier gas as taught by Yanashima et al.

16. Further, with respect to claim 4, Yanashima et al. fail to teach the aluminum source being controllable positionable.

17. King teaches discloses a single crystal growing apparatus capable of controllably positioning a source material for the purpose of controlling the temperature of the source material as needed for an intended processing method (column 1, row 9 through column 2, row 60).

18. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided the elongated source in Yanashima et al. as a controllably positionable source in order to control the temperature of the elongated source as needed for an intended processing method as taught by King.

19. With respect to claim 5, where the only additional recitations are drawn to duplicating a part described above, the courts have ruled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F. 2d 669, 124 USPQ 378 (CCPA 1960).

20. With respect to claims 7-8, Yanashima and King disclose the invention substantially as claimed and as described above. Additionally, Yanashima et al. disclose use of an acceptor impurity source (Be, Mg, Ca, Zn and Cd) or a donor impurity source (C, Si, Ge and Sn) (column 3, rows 5-15). Were the either of the impurity sources used in the reactor, the heater (141) would obviously act as heating means.

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21. However, Yanashima et al. and King fail to teach the impurity source zones coupled to said inert gas source.

22. Yanashima et al. teach other source zones coupled to the inert gas source for the purpose of using nitrogen gas as a carrier gas as detailed above.

23. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an impurity source zone coupled to the inert gas source in Yanashima et al. and King in order to use the nitrogen as a carrier gas as taught by Yanashima et al.

24. With respect to claims 12 and 13, the halide gas source supplies HCl gas and the reaction gas source supplies ammonia gas as claimed and described above. However, Examiner notes that the courts have ruled that expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

25. With respect to claim 14, the apparatus of Yanamisha et al. would be capable for use with a modified hydride vapor epitaxial process (see abstract). Examiner notes that the courts have ruled that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

26. With respect to claims 17 and 18, the gallium source as described above, would be capable of moving between first and second positions within the reactor tube.

27. With respect to claim 20, said extended gallium source is capable of being controllable positioned so that the extended gallium source is moveable into and out of the reactor tube. In order to supply the source to the apparatus at the beginning of a process, the source would obviously have to be moveable into and out of the apparatus.

28. With respect to claim 22, according the disclosure of King, the gallium source would be controllably movable relative to the reactor tube.

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29. With respect to claim 24, the substrate is in the reactor tube and separate from said gallium source.

30. With respect to claim 25, the structural limitations of the claim are addressed above. Applicant's recitations involving a method for using the apparatus do not distinguish themselves from the prior art in terms of structure and the courts have ruled that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

31. Claims 6 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanashima et al. and King as applied to claims 1-5, 7-8, 12-14, 17-18, 20, 13 and 24-25 above, and further in view of U.S. Patent No. 4,268,842 to Jacob et al.

32. Yanashima et al. and King disclose the invention substantially as claimed and as described above.

33. However, Yanashima et al. and King fail to teach the multi-zone heater as a resistive heater.

34. Jacob et al. teach the use of a multi-zone resistive heating furnace for the purpose of heating both a gallium source and a substrate in a reactor (column 11, rows 10-19).

35. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a multi-zone resistive heater in Yanashima et al. and King in order to heat a gallium source and a substrate within a reactor as taught by Jacob et al.

36. With respect to claim 26, the structural limitations of the claim are addressed above. Applicant's recitations involving a method for using the apparatus do not distinguish themselves from the prior art in terms of structure and the courts have ruled that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).



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37. Claims 9-11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanashima et al. and King as applied to claims 1-5, 7-8, 12-14, 17-18, 20, 13 and 24-25 above, and further in view of U.S. Patent No. 5,266,127 to Imaizumi et al.

38. Yanashima et al. and King disclose the invention substantially as claimed and as described above.

39. However, Yanashima et al. and King fail to teach the reactor further comprising means for transferring said at least one substrate within said growth zone to a second growth zone, independently of the gallium source.

40. Imaizumi et al. disclose the use of means for transferring a substrate between two growth zones for the purpose of growing two different layers on a single substrate in a single system (see Figure 9; column 2, rows 3-13).

41. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided means for transferring a substrate between to growth zones in Yanashima et al. and King in order to grow two different layers on a single substrate in a single system as taught by Imaizumi et al.

42. With respect to claim 10, specific details are not given regarding heating the second growth zone in Imaizumi et al.

43. Yanashima et al. teach using an external multi-zone heater for the purpose of providing a temperature gradient in a lengthwise direction (column 11, rows 48-52).

44. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have used the external multi-zone heater in Yanashima et al., King and Imaizumi to heat both the first and second growth in order to provide each with a temperature gradient in a lengthwise direction as taught by Yanashima et al.

45. With respect to claim 11, which contains recitations drawn to a specific method that could be carried out using the apparatus, Examiner notes that the courts have ruled that claims directed to

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apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

46. In general, Examiner notes that many of Applicant's claims are drawn to ideal temperatures for carrying out an intended operation. The prior art cited above has the capability to attain these temperatures and therefore has been applied against the claimed invention **with respect to their structures**, rather than their intended operation.

47. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanashima et al. and King as applied to claims 1-5, 7-8, 12-14, 17-18, 20, 13 and 24-25 above, and further in view of Japanese Patent No. 59229816 to Konno.

48. Yanashima et al. and King disclose the invention substantially as claimed and as described above.

49. However, Yanashima et al. and King fail to teach a control rod for manipulating the position of the gallium source.

50. Konno teaches the use of a control rod (10) in a vapor growth apparatus for the purpose of moving a source material to an upstream side of the reaction tube for the purpose of improving composition of each layer, growing rate and reproducibility (abstract).

51. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a control rod in Yanashima et al. and King in order to move a source material to an upstream side of a reaction tube and improve composition, growing rate and reproducibility as taught by Konno.

52. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanashima et al. and King as applied to claims 1-5, 7-8, 12-14, 17-18, 20, 13 and 24-25 above, and further in view of U.S. Patent No. 5,223,305 to Tanaka et al.

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53. Yanashima et al. and King disclose the invention substantially as claimed and as described above.

54. However, Yanashima et al. and King fail to teach said gallium source comprising an extended source tube.

55. Tanaka et al. teach the use of an extended source tube for the purpose of providing a structure for introducing materials into a reactor (column 2, rows 9-13).

56. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an extended gallium source tube in Yanashima et al. and King in order to introduce materials into the reactor as taught by Tanaka et al.

#### ***Response to Arguments***

57. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection. In the rejections above, King, Konno and Tanaka are relied upon for teaching newly added recitations. Applicant's arguments are mute because the rejections have been restructured to take into account these recitations. With respect to Applicant's argument's regarding the relied upon reference not teaching an intended method where the reactor is controlled to have the recited portions of gallium at the recited temperatures, as repeatedly noted above, the claimed invention is drawn to an apparatus and not a method of using an apparatus. The courts have ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karla Moore  
Patent Examiner  
Art Unit 1763  
20 February 2006